

- 1           1.    A method comprising:  
2                attaching ligands along the length of a polymer  
3   to form a brush for cleaning semiconductor wafers.
- 1           2.    The method of claim 1 including attaching ligands  
2   using a hydrolysis reaction.
- 1           3.    The method of claim 1 including attaching ligands  
2   along the length of a polyvinyl alcohol polymer.
- 1           4.    The method of claim 1 including using a coupling  
2   agent to attach ligands along the length of a polymer  
3   chain.
- 1           5.    The method of claim 1 including attaching ligands  
2   to provide a hydrophilic property.
- 1           6.    The method of claim 1 including attaching ligands  
2   to provide hydrophobic property.
- 1           7.    The method of claim 1 including attaching ligands  
2   to provide a reducing agent property.
- 1           8.    The method of claim 1 including attaching ligands  
2   to provide an oxidizing property.

1           9.    The method of claim 1 including attaching ligands  
2   to provide an attraction to a specific material.

1           10.   The method of claim 1 including attaching ligands  
2   to change the zeta potential.

1           11.   The method of claim 1 including attaching a  
2   ligand having a subchain to the polymer.

1           12.   The method of claim 11 including attaching a  
2   moiety to said subchain to provide a desired property to  
3   said ligand.

1           13.   A method comprising:  
2                cleaning a semiconductor wafer using a polymer  
3   brush having ligands attached along the length of a  
4   polymer.

1           14.   The method of claim 13 including using a brush  
2   having ligands attached to polyvinyl alcohol polymer  
3   bristles.

1           15.   The method of claim 13 including using a brush  
2   having ligands that to provide a hydrophilic property.

1        16. The method of claim 13 including using a brush  
2        having ligands that provide a hydrophobic property.

1        17. The method of claim 13 including using a brush  
2        having ligands that provide a reducing agent property.

1        18. The method of claim 13 including using a brush  
2        having ligands that provide an oxidizing property.

1        19. The method of claim 13 including using a brush  
2        having ligands that are attracted to a specific material.

1        20. The method of claim 13 including using a brush  
2        having ligands having a positive zeta potential.

1        21. The method of claim 13 including using a brush  
2        having ligands having a negative zeta potential.

1        22. The method of claim 13 including using a brush  
2        having a ligand having a subchain of at least two carbon  
3        atoms.

1        23. The method of claim 22 including using a brush  
2        having a moiety on said subchain to provide a desired  
3        property to said ligand.

1           24. A brush for cleaning semiconductor wafers  
2 comprising:  
3           a polymer chain having ligands attached along the  
4 length of the chain.

1           25. The brush of claim 24 wherein said chain is a  
2 polyvinyl alcohol polymer chain.

1           26. The brush of claim 25 wherein said chain is a  
2 formal polyvinyl alcohol chain.

1           27. The brush of claim 24 wherein one of said ligands  
2 includes a hydrophilic moiety.

1           28. The brush of claim 24 wherein one of said ligands  
2 includes a hydrophobic moiety.

1           29. The brush of claim 24 wherein one of said ligands  
2 includes a reducing agent moiety.

1           30. The brush of claim 24 wherein one of said ligands  
2 includes an oxidizer.

1           31. The brush of claim 24 wherein one of said ligands  
2 includes a moiety attracted to a specific material.

1           32. The brush of claim 24 wherein one of said ligands  
2 includes a negative zeta potential moiety.

1           33. The brush of claim 24 wherein one of said ligands  
2 includes a positive zeta potential moiety.

1           34. The brush of claim 24 wherein one of said ligands  
2 is attached to a carbon chain having at least two carbon  
3 atoms.